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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/722,485	11/28/2000	Masaki Narushima	200246US2	5554

22850 7590 10/20/2004

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EXAMINER	
ZERVIGON, RUDY	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 10/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/722,485	NARUSHIMA, MASAKI
	Examiner	Art Unit
	Rudy Zervigon	1763

S.C.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *See Continuation Sheet* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-6,9-12,17-22,26,27,30-32,36-42,44,56,58-60,62,63,67,75 and 76* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

Continuation of Disposition of Claims: Claims pending in the application are 1,4-6,9-12,17-22,26,27,30-32,36-42,44,56,58-60,62,63,67,75 and 76.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1, 4-6, 10-12, 17-19, 30-32, 36-39, 44, and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Logan et al (USPat. 5,155,652) and Gilchrist, Robin et al (US 5,846,375 A) in view of Manabu Edamura (JP407337630A)[1]. Logan et al teaches a ceramic heater system comprising an upper heater base (124, Figure 3) partly, not integrally[2], formed of a ceramic material (column 3, lines 34-45; column 5, lines 26-32); and a lower heater base (130, Figure 3) formed of a ceramic material (column 3, lines 45-60; column 5, lines 26-32), the upper and lower heater bases forming a one-body heater base ("conducting electrical energy"; column 3, lines 46-53), with a lower surface of the upper heater base being in tight contact with the lower heater base once the components of the electrostatic chuck assembly (120) are assembled, the heater base (120, Figure 3 once assembled) comprising:

a mounting surface (122; Figure 3; column 2, lines 54-60 – boron nitride "isolation layer", column 3, lines 5-10) which is formed as an upper surface of the <u>upper</u> heater base (124, Figure 3 once assembled) and configured to receive an object ("semiconductor wafer under process (not shown)") thereon.

[1] Machine Translation from http://www1.ipdl.jpo.go.jp/PA1/cgi-bin/PA1DETAIL

[2] Integral – **3:** lacking nothing essential: ENTIRE – integrality , integrally. Merriam-Webster's Collegiate Dictionary - 10th Ed. p.607

a metal (column 2, lines 58-63) heater (134 – column 3, lines 40-43; "heating layer", column 3, lines 46-53), disposed in the upper heater base (124; Figure 3), and configured to heat the object (column 3, lines 32-45),

a helium gas passage (150; column 5, lines 15-25) formed in the lower surface of the lower heater base (130, Figure 3; column 5, lines 1-5) and formed as a groove through which a gas is supplied toward the mounting surface,

wherein the heater base is cooled by causing a gas (column 3, lines 59-65; column 4, lines 1-13) whose temperature is lower than a temperature of the lower heater base (column 4, lines 1-13) to be supplied through the gas passage.

Logan further teaches a ceramic (column 4, lines 41-48) heater system (Figure 1) comprising: a ceramic heater base (120, Figure 3; column 3, lines 32-53) formed of a ceramic material (column 4, lines 41-48). The heater base comprising a object ("product wafer (not shown)"; column 4, line 1) mounting surface formed on an upper surface (122, Figure 3) thereof; a heater winding (134, "heating pattern" Figure 3; column 3, lines 30-50), disposed (column 4, lines 28-49) in the heater base and configured to heat an object; and a gas passage (150, Figure 3; column 3, lines 59-65) provided in the heater base (after bonding – column 4, lines 28-49) below the heater, whereby the heater base is cooled by causing a gas (column 3, lines 59-65; column 4, lines 1-13) whose temperature is lower than a temperature of the heater base (column 4, lines 1-13) to be supplied through the gas passage.

Claim 10: The ceramic heater system (120, Figure 3) according to claim 1, wherein the heater (134, Figure 3; column 3, lines 30-50) is formed of graphite (column 3, line 38) shaped in such a pattern as to evenly generate heat in the heater base.

Claim 12: The ceramic heater system (120, Figure 3) according to claim 1, further comprising: an electrode (126, Figure 3) disposed in the heater base and located between the heater (134) and the and the mounting surface (122; column 2, lines 54-57); and a DC power (column 2, line 65 – column 3, line 5) supply for applying a DC voltage to the electrode; whereby applying the DC voltage to the electrode causes the object mounted on the mounting surface to be electrostatically chucked.

Logan further teaches that the gas passage has a gas inlet and a gas outlet (not shown, Figure 1) formed in a lower surface (140) of the lower heater base (130, column 3, lines 62-68) – "circulating a cooling gas" requires an entrance and exit connected to a pump.

Logan further teaches the ceramic heater wherein the gas which flows in the gas passage is at least one gas selected from Ar, He, Ne and N_2 gases or a mixed gas thereof (column 4, lines 1-13). Logan also teaches - 11. The ceramic heater system according to claim 9, wherein the heater has glassy boron nitride (column 3, lines 32-40) coated on an outer surface of graphite of which the heater is formed (column 3, line 38). 5. - The ceramic heater wherein the gas which flows in the gas passage is at least one gas selected from Ar, He, Ne and N_2 gases or a mixed gas thereof (column 4, lines 5-10).

Logan does not teach a gas passage provided in the lower surface of the upper heater base. Logan does not teach that the heater base is monolithically, and integrally, formed of a ceramic material. In particular the only components that are not made of boron nitride (ceramic material) are the pattern layer (upper heater base) and the heat sink base (gas passage; Figure 3). Logan also does not teach the ceramic heater system wherein the heater has a high-melting-point metal.

Logan also does not teach a glassy boron nitride layer coated over Logan's graphite heater (134, column 3, lines 34-36) embedded in Logan's pyrolytic boron nitride (130, column 3, lines 32-35). Logan does not teach that the upper heater base and lower heater base are coupled together by a ceramic adhesive, however Logan does teach that the heat sink base (140) and the support (152) are coupled together by a ceramic adhesive (column 4, lines 28-45).

Gilchrist, Robin et al teaches a heater/cooling chuck base (15; Figure 3,4; column 3, lines 1-8) that is monolithically formed (see constant cross-hatching; Figures 3, 4).

Logan and Gilchrist do not teach:

The ceramic heater system according to claim 1, wherein the gas passage has a plurality of concentric circular passage portions and a plurality of penetration passage portions connecting the circular portions passage, and any adjacent two of the penetration passage portions are not aligned in a radial direction

The ceramic heater system, wherein the gas passage has a gas inlet <u>formed in a central portion of</u> a lower <u>surface</u> of the heater base and gas outlets <u>formed in outer circumference portions of the lower surface</u> of the heater base, as claimed by claim 4

Argon gas as a the heat transfer gas, as claimed by claim 6

A glassy boron nitride layer coated over Logan's graphite heater (134, column 3, lines 34-36) embedded in pyrolytic boron nitride (column 3, lines 32-35), as claimed by claim 11

The ceramic heater system according to claim 1, wherein the gas passage has a gas inlet formed in a central portion of a lower surface of the heater base and a plurality of gas outlets formed through circumferential side walls of the heater base, as claimed by claim 17

A chamber whose interior can be kept in a vacuum state by and exhaust system and a heater base that is integrally formed of a ceramic material, as claimed by claim 19 because Logan only teaches ceramic materials (boron nitride) for the heater base components of 122, 130 as discussed above. Logan teaches base 140 made from KOVAR and does not teach a specific material for component 124

Manabu Edamura teaches a similarly cooled electrostatic chuck arrangement (Figures 1, 2, 7; abstract) comprising an electrostatic chuck (3, abstract): first gas passage (7, abstract; Figure 7) provided in the chuck base whereby the base is cooled by letting a gas (helium and argon; abstract) to flow in the gas passage further comprising:

An electrostatic chuck wherein the gas passage has a plurality of concentric circular first passage portions (7, abstract; Figure 7) and a plurality of penetration second passage portions (3, abstract; Figure 7) connecting the circular portions passage – see Figure 7 and compare with Applicant's Figure 2. Gas passages (7, Figure 1, 2, 7) with a gas inlet (6, Figure 1,2) <u>formed in a central portion of</u> a lower <u>surface</u> of the heater base and gas outlets (7, Figure 1,2) <u>formed in outer circumference portions of the lower surface</u> of the base. The ceramic heater wherein the gas which flows in the gas passage is at least one gas selected from Ar and He (abstract). Gas passages with a gas inlet (6, Figure 2) formed in a central portion (6, Figure 2) of a lower surface of the heater base and a plurality of gas outlets formed through circumferential side walls of the heater base – Figure 3 shows the pressure distribution across the back surface of the wafer. The pressure is shown at 10Torr at the center ([Example]) and drops to 5mTorr (the chamber pressure, [Example]). As a result of the pressure gradient from the center to the edge of the back

surface, a flow of coolant is established. A chamber (1) whose interior can be kept in a vacuum state (5mTorr [Example]) by and exhaust system (2) and a heater base (3)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to extend the height of Logan's temperature controlling chambers 150 such that a gas passage is provided in the lower surface of the upper heater base, and for Logan to manufacture a monolithic heat sink base (140), as taught by Gilchrist, and pattern layer (124) of boron nitride or other ceramics (column 3, lines 13-15) and for Logan to replace his pyrolitic graphite material with a high-melting point metal material comprising fabricating Logan's substrate layer of boron nitride with a coating of glassy boron nitride there over and bonding additional components of his ceramic heater with his ceramic adhesive.

Motivation to extend the height of Logan's temperature controlling chambers 150 such that a gas passage is provided in the lower surface of the upper heater base is to further control heat transfer between Logan's ceramic heater layers as taught by Logan (column 2, lines 10-15), further motivation for Logan to manufacture a monolithic heat sink base (140), as taught by Gilchrist is to eliminate a required "seal ring" as taught by Logan (column 4, lines 28-49). Additionally, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04).

Motivation for Logan to manufacture his heat sink base (140) and pattern layer (124) of boron nitride or other ceramics (column 3, lines 13-15) and for Logan to replace his pyrolitic graphite material with a high-melting point metal material comprising fabricating Logan's substrate layer 45 of boron nitride with a coating of glassy boron nitride there over is to provide for alternate and equivalent material of construction and bonding comprising providing thermal expansion matching (column 4, lines 14-16).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Logan and Gilchrist to replace the heat sink base with Manabu Edamura's heat sink base made of ceramic material with staggered second passages, and for Logan and Gilchrist to replace his pyrolitic graphite material with a high-melting point metal material comprising fabricating Logan's substrate layer of boron nitride with a coating of glassy boron nitride there over.

Motivation for Logan and Gilchrist to replace the heat sink base with Manabu Edamura's heat sink base made of ceramic material with staggered second passages is to provide for uniform heating or cooling of the semiconductor wafer as taught by Manabu Edamura (abstract) by increasing mixing.

Motivation for Logan and Gilchrist to replace the pyrolitic graphite material with a high-melting point metal material comprising fabricating Logan's substrate layer of boron nitride with a coating of glassy boron nitride there over is to provide alternate and equivalent material of construction.

3. Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable over Logan et al (USPat. 5,155,652), Gilchrist, Robin et al (US 5,846,375 A), and Manabu Edamura (JP407337630A) in view of Ameen et al (USPat. 6,143,128). All of Logan,

Gilchrist, and Manabu Edamura are discussed above. Logan further teaches, in a separate embodiment (Figure 1), a lower electrode (50; column 3, lines 1-5) in the heater base (40, Figure 1; column 3, lines 32-53) and located between an upper surface (42) of the heater base and a heater (60). However, Logan, Gilchrist, and Manabu Edamura do not teach a showerhead fed by a process-gas supply mechanism. Manabu Edamura and Logan each do not teach an RF powered showerhead that is electrically isolated. Ameen teaches a similar plasma processing apparatus (Figure 1; column 5, line 66 – column 6, line 30) comprising a showerhead (61) fed by a process-gas supply mechanism (11). Ameen teaches an RF powered showerhead that is electrically isolated (column 7, lines 9-26, 33-44). Ameen further teaches an etching gas (21, 22, 29; Figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Ameen's electrically isolated RF powered showerhead and process-gas supply mechanism to Manabu Edamura's processing apparatus comprising adding a lower electrode to Manabu Edamura's second embodiment (Figure 3).

Motivation to add Ameen's electrically isolated RF powered showerhead and process-gas supply mechanism to Manabu Edamura's processing apparatus comprising adding a lower electrode to Manabu Edamura's second embodiment (Figure 3) is to evenly distribute the process gases over the substrate and to provide additional heating.

4. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Logan et al (USPat. 5,155,652), Gilchrist, Robin et al (US 5,846,375 A), and Manabu Edamura (JP407337630A) in view of Fuji et al (USPat. 6,135,052). Logan, Gilchrist, and Manabu Edamura are discussed above. Logan, Gilchrist, and Manabu Edamura do not teach means for

temperature adjustment of the gas coolant from a heat exchanger when controlling wafer temperature. Fuji et al teaches equivalent wafer temperature control means comprising a temperature controller (12, Figure 1) for a predetermined temperature of a gas coolant by a heat exchanger (item 4, Figure 1; claim 1; column 2, lines 47-52), configured to either remove or add heat, thereby imparting temperature control of a wafer. Fuji et al also teaches a showerhead with associated process gas supply (column 3, lines 60-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Logan, Gilchrist, and Manabu Edamura's coolant gas sources with Fuji's coolant gas sources comprising wafer temperature control means for temperature adjustment of the gas coolant.

Motivation to replace Logan, Gilchrist, and Manabu Edamura's coolant gas sources with Fuji's coolant gas sources comprising wafer temperature control means for temperature adjustment of the gas coolant is to provide for wafer temperature control during processing as taught by Fuji (column 2, lines 39-46).

5. Claims 26, 27, and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Logan et al (USPat. 5,155,652), Gilchrist, Robin et al (US 5,846,375 A), and Manabu Edamura (JP407337630A) in view of Steger et al (USPat. 5,788,799). Logan, Gilchrist, and Manabu Edamura are discussed above. Logan further teaches an oxide-based metallic material ("alumina"; column 3, line 15 – Al_2O_3). However, Logan, Gilchrist, and Manabu Edamura do not teach aluminum nitride (AlN) as an alternate ceramic material. Steger teaches ceramic liner materials (claim 6) for plasma facing chamber components (column 7,lines 41-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Logan, Gilchrist, and Manabu Edamura to replace his boron nitride component materials with aluminum nitride as taught by Steger.

Motivation for Logan, Gilchrist, and Manabu Edamura to replace his boron nitride component materials with aluminum nitride as taught by Steger is to provide alternate and equivalent materials of construction as taught by Steger (claims 2, 6, and 10).

6. Claims 41, 42, 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Logan et al (USPat. 5,155,652), Gilchrist, Robin et al (US 5,846,375 A), and Manabu Edamura (JP407337630A) in view of Whitaker et al (USPat. 4,622,687). Logan, Gilchrist, and Manabu Edamura are discussed above. However, Logan, Gilchrist, and Manabu Edamura do not teach his gas passage having an increased surface area thereby providing an improved heat transfer (heating/cooling efficiency). Whitaker teaches a heat transfer gas conduit (43, Figure 2, 2A) with an increased surface area (surface roughness; column 18, line 68 – column 19, line 2) thereby providing an improved heat transfer (heating/cooling efficiency).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Logan, Gilchrist, and Manabu Edamura to roughen the internal surface area of the gas conduit as taught by Whitaker.

Motivation for Logan, Gilchrist, and Manabu Edamura to roughen the internal surface area of the gas conduit is to provide an improved heat transfer as taught by Whitaker (column 18, line 68 – column 19, line 2).

7. Claims 9, 56, and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Logan et al (USPat. 5,155,652), Gilchrist, Robin et al (US 5,846,375 A), and Manabu Edamura

(JP407337630A) in view of Arai et al (JP07272837 A). Logan, Gilchrist, and Manabu Edamura are discussed above. Logan, Gilchrist, and Manabu Edamura do not teach heater formed in a coil form. Arai teaches a similar ceramic heater (Title; Figures 1,2) comprising a heater (2; Figure 1a) formed in a coil form.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to shape Logan, Gilchrist, and Manabu Edamura's heater in a coil form as taught by Arai.

Motivation to shape Logan, Gilchrist, and Manabu Edamura's heater in a coil form as taught by Arai is to provide uniform temperature distribution (Constitution).

8. Claim 59 is rejected under 35 U.S.C. 103(a) as being unpatentable over Logan et al (USPat. 5,155,652), Gilchrist, Robin et al (US 5,846,375 A), Arai et al (JP07272837 A), and Manabu Edamura (JP407337630A) in view of Whitaker et al (USPat. 4,622,687). Logan, Gilchrist, Arai, and Manabu Edamura are discussed above. However, Logan, Gilchrist, Arai, and Manabu Edamura do not teach his gas passage having an increased surface area thereby providing an improved heat transfer (heating/cooling efficiency). Whitaker teaches a heat transfer gas conduit (43, Figure 2, 2A) with an increased surface area (surface roughness; column 18, line 68 – column 19, line 2) thereby providing an improved heat transfer (heating/cooling efficiency).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to roughen the internal surface area of Logan, Gilchrist, Arai, and Manabu Edamura's gas conduit as taught by Whitaker.

Motivation to roughen the internal surface area of Logan, Gilchrist, Arai, and Manabu Edamura's gas conduit as taught by Whitaker is to provide an improved heat transfer as taught by Whitaker (column 18, line 68 – column 19, line 2).

9. Claim 60 is rejected under 35 U.S.C. 103(a) as being unpatentable over Logan et al (USPat. 5,155,652), Gilchrist, Robin et al (US 5,846,375 A), Arai et al (JP07272837 A), and Manabu Edamura (JP407337630A) in view of Whitaker et al (USPat. 4,622,687). Logan, Gilchrist, Arai, and Manabu Edamura are discussed above. However, Logan, Gilchrist, Arai, and Manabu Edamura do not teach his gas passage having an increased surface area thereby providing an improved heat transfer (heating/cooling efficiency). Whitaker teaches a heat transfer gas conduit (43, Figure 2, 2A) with an increased surface area (surface roughness; column 18, line 68 – column 19, line 2) thereby providing an improved heat transfer (heating/cooling efficiency).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to roughen the internal surface area of Logan, Gilchrist, Arai, and Manabu Edamura's gas conduit as taught by Whitaker.

Motivation to roughen the internal surface area of Logan, Gilchrist, Arai, and Manabu Edamura's gas conduit as taught by Whitaker is to provide an improved heat transfer as taught by Whitaker (column 18, line 68 – column 19, line 2).

10. Claim 75 is rejected under 35 U.S.C. 103(a) as being unpatentable over Logan et al (USPat. 5,155,652), Gilchrist, Robin et al (US 5,846,375 A), Arai et al (JP07272837 A), and Manabu Edamura (JP407337630A) in view of Beaudoin et al (USPat. 3,911,386). Logan, Gilchrist, Arai, and Manabu Edamura are discussed above. Logan, Gilchrist, Arai, and Manabu

Edamura do not teach the material for a high-melting point metal electrode is one of tungsten (W), molybdenum (Mo), and platinum (Pt). Beaudoin teaches the material for a high-melting point metal electrode (14; Figure 1) is made from platinum (abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to manufacture Logan, Gilchrist, Arai, and Manabu Edamura's metal electrode from platinum as taught by Beaudoin.

Motivation to manufacture Logan, Gilchrist, Arai, and Manabu Edamura's metal electrode from platinum as taught by Beaudoin is to operate Logan and Arai's metal electrode at elevated temperatures as taught by Beaudoin (column 2, lines 26-30).

11. Claim 76 is rejected under 35 U.S.C. 103(a) as being unpatentable over Logan et al (USPat. 5,155,652), Gilchrist, Robin et al (US 5,846,375 A), and Manabu Edamura (JP407337630A) in view of Beaudoin et al (USPat. 3,911,386). Logan, Gilchrist, and Manabu Edamura are discussed above. Logan, Gilchrist, and Manabu Edamura do not teach the material for a high-melting point metal electrode is one of tungsten (W), molybdenum (Mo), and platinum (Pt). Beaudoin teaches the material for a high-melting point metal electrode (14; Figure 1) is made from platinum (abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to manufacture Logan, Gilchrist, and Manabu Edamura's metal electrode from platinum as taught by Beaudoin.

Motivation to manufacture Logan, Gilchrist, and Manabu Edamura's metal electrode from platinum as taught by Beaudoin is to operate Logan and Arai's metal electrode at elevated temperatures as taught by Beaudoin (column 2, lines 26-30).

Response to Arguments

12. Applicant's arguments with respect to claims 1, 18, 19, and 56 have been considered but are moot in view of the new grounds of rejection.

Conclusion

13. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should

be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (571) 272-1439.

10/18/4